VPFP Vermont Pay-For-Phosphorus Program

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agriculture.vermont.gov/VPFP

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AGENCY OF AGRICULTURE, FOOD & MARKETS

Vermont Agency of Agriculture, Food & Markets
Water Quality Division

USDA
Program funded by
United States Department of Agriculture
Natural Resources Conservation Service

Overview:

- NRCS RCPP AFA Award
- Historical Background
- Payment for Performance
- Vermont Pay-for-Phosphorus Program
- Timeline & Next Steps
- Questions

NRCS Regional Conservation Partnership Program Projects – FY 2019-2020

Natural Resources Conservation Service

Note: Map locations are approximate.

USDA United States Department of Agriculture

RCPP Classic Projects | RCPP Alternative Funding Arrangements Projects

Audubon Conservation Ranching Initiative

Black River Watershed

Improving Forest Health Through Aggregation

Innovative Conservation: Vital Streams and Forests

Nebraska Forest Restoration Partnership

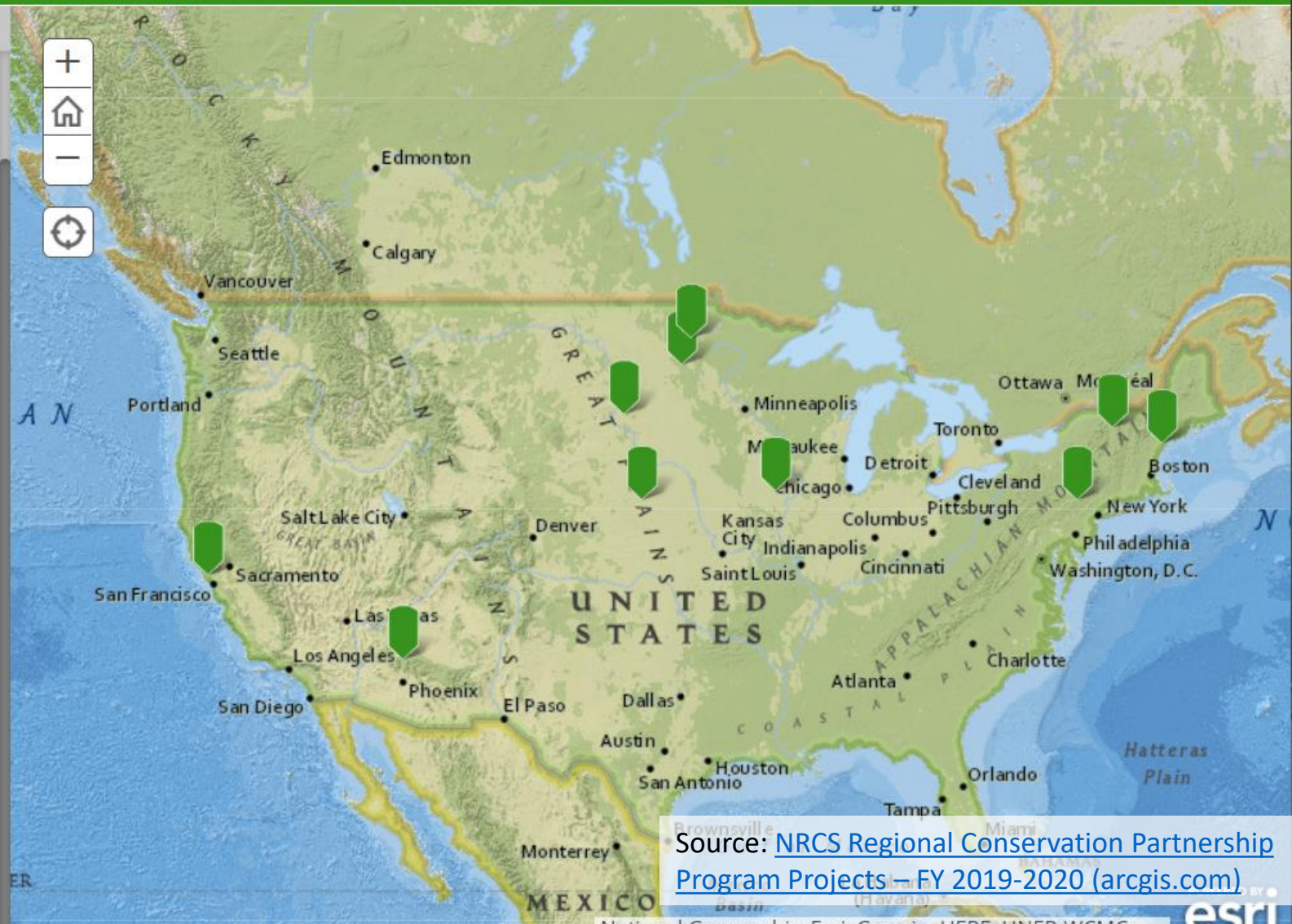
Recharge in the Upper Verde River Watershed

Scaling Soil Health in the Prairie Pothole Region

Sebago Watershed Protection Investment...

Soil and Water Outcomes Fund

Vermont Pay-for-Phosphorus Program



Source: [NRCS Regional Conservation Partnership Program Projects – FY 2019-2020 (arcgis.com)]

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Vermont Pay-for-Phosphorus (VPFP) Program

Lead Partner: Vermont Agency of Agriculture, Food and Markets (AAFM)

Project: 5 years (mid 2021 – mid 2026)

Award: $7 million with **$4.9 million** directly to producers

Timeline:

- 2021: Conservation Innovation Grant (CIG) Research
- Late fall 2021: VPFP Application opens
- Winter 2022: First VPFP payments - for 2022 crop season P reductions
- 2023-2025: Annual VPFP application/re-enrollment

Historical Background

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TMDL - Required Reductions

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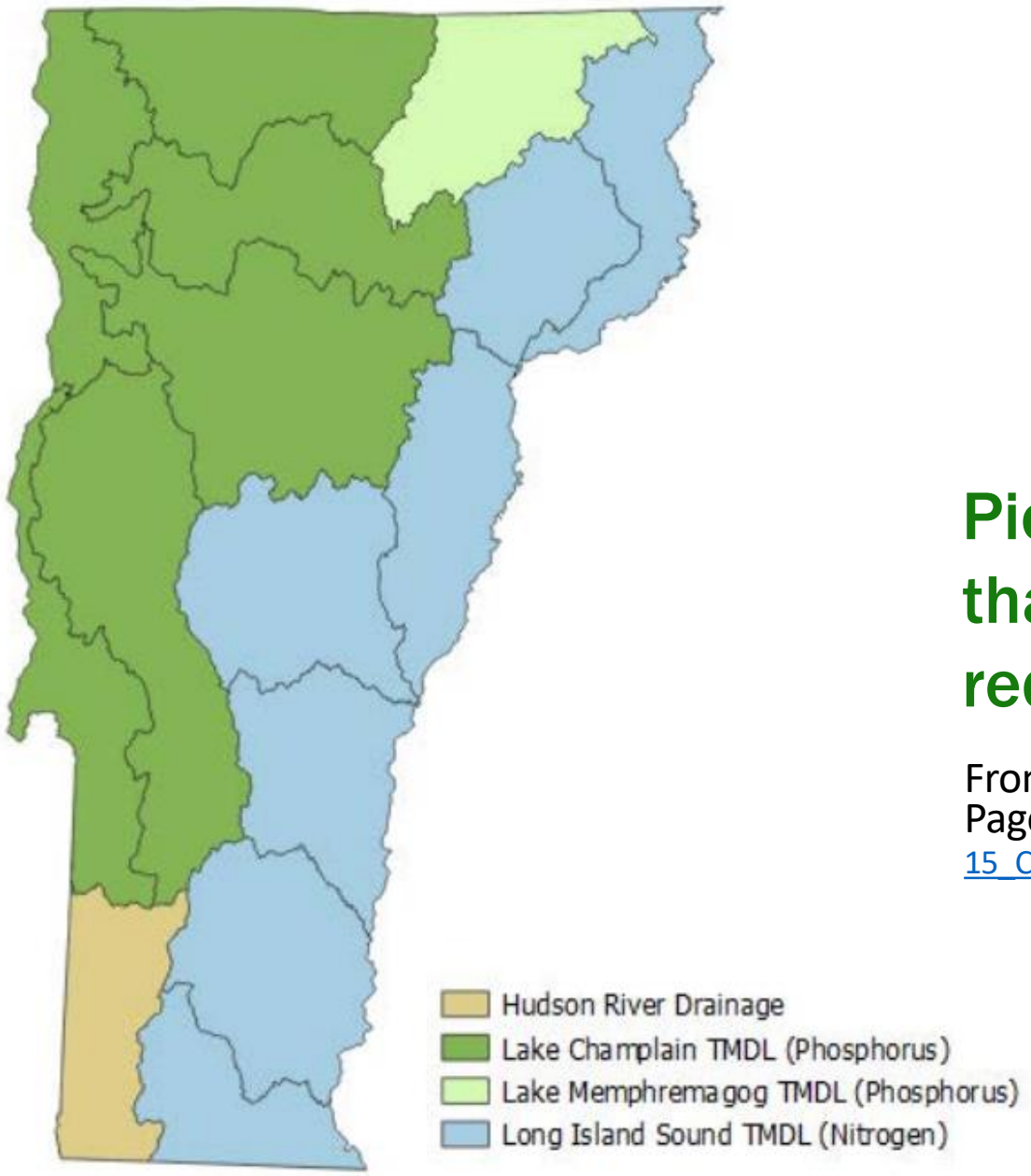

Pictured: Vermont's large-scale TMDLs that require nutrient pollutant reductions (nutrients noted in legend)

From Vermont Clean Water Initiative 2020 Performance Report, Page 11: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2021-01-15_CleanWaterPerformanceReport_SFY2020-FINA-PDF-A.pdf

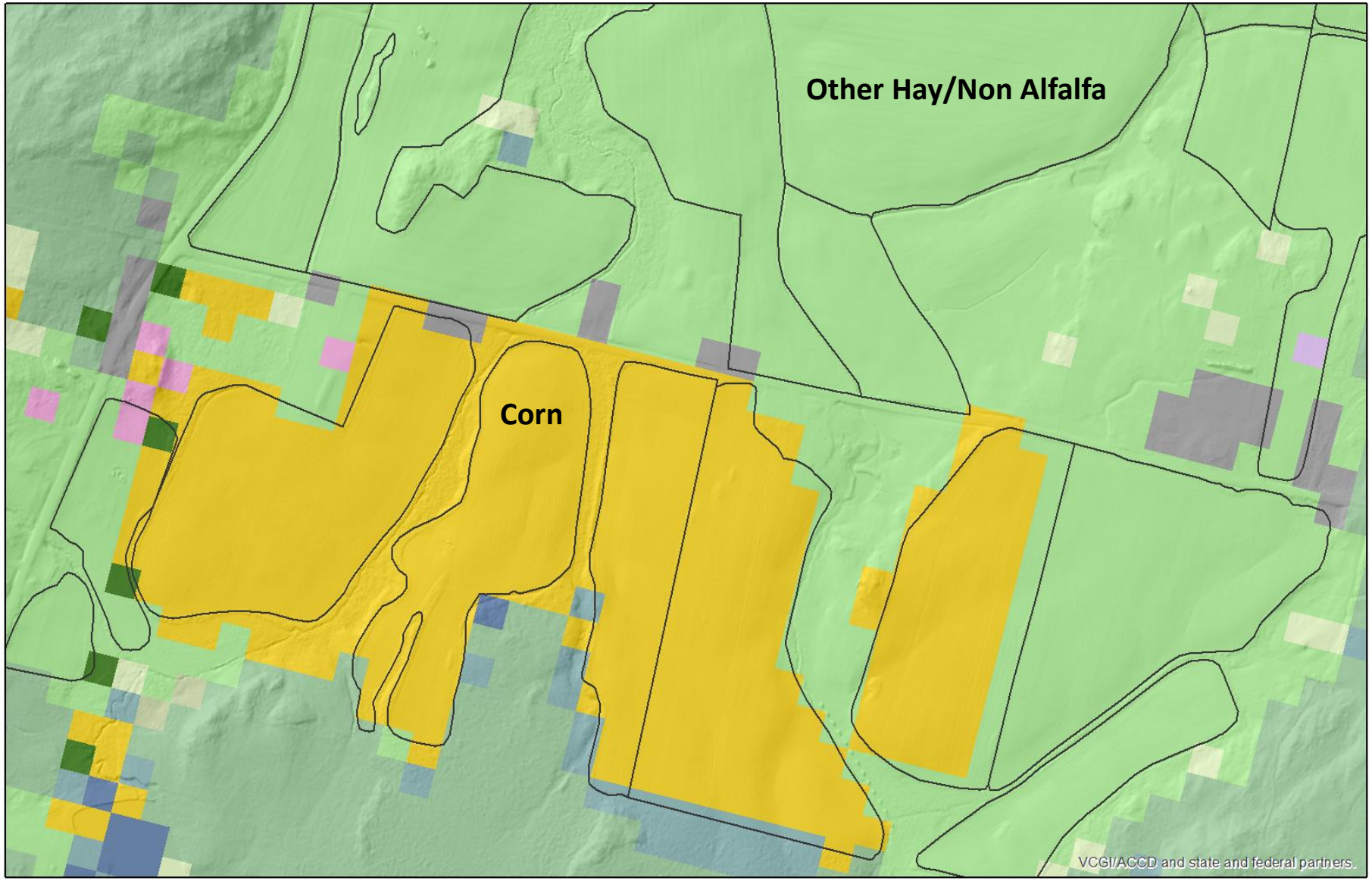
Other Hay/Non Alfalfa
Corn
VCGI/ACCD and state and federal partners.

Table A-2. Agricultural practices for permanent corn crop

Permanent Corn on poorly drained soils	Permanent Corn on moderate/well-drained soils
5/10 - Tillage (disk plow) 5/15 - Fertilizer application (40 lbs/ac of nitrogen) 5/15 - Fertilizer application (40 lbs/ac of P_2O_5) 5/15 - Begin plant growing season 7/10 - Fertilizer application (95 lbs/ac of nitrogen) 10/1 - Harvest and kill 10/10 - Fertilizer application (8000 gals/ac of liquid dairy manure) (64 lb/ac N, 64 lb/ac P_2O_5) 10/15 - Tillage (chisel plow)(moldboard plow)	5/1 - Fertilizer application (6000 gals/ac of liquid dairy manure) (96 lb/ac N, 48 lb/ac P_2O_5) 5/5 - Tillage (chisel plow) 5/10 - Tillage (disk plow) 5/15 - Fertilizer application (40 lbs/ac of nitrogen) 5/15 - Fertilizer application (40 lbs/ac of P_2O_5) 5/15 - Begin plant growing season 7/10 - Fertilizer application (140 lbs/ac of nitrogen) 10/1 - Harvest and kill 10/2 - Fertilizer application (3000 gals/ac of liquid dairy manure) (24 lb/ac N, 24 lb/ac P_2O_5) 10/15 - plant cover crop

Lake Champlain Basin TMDL - Required Reductions

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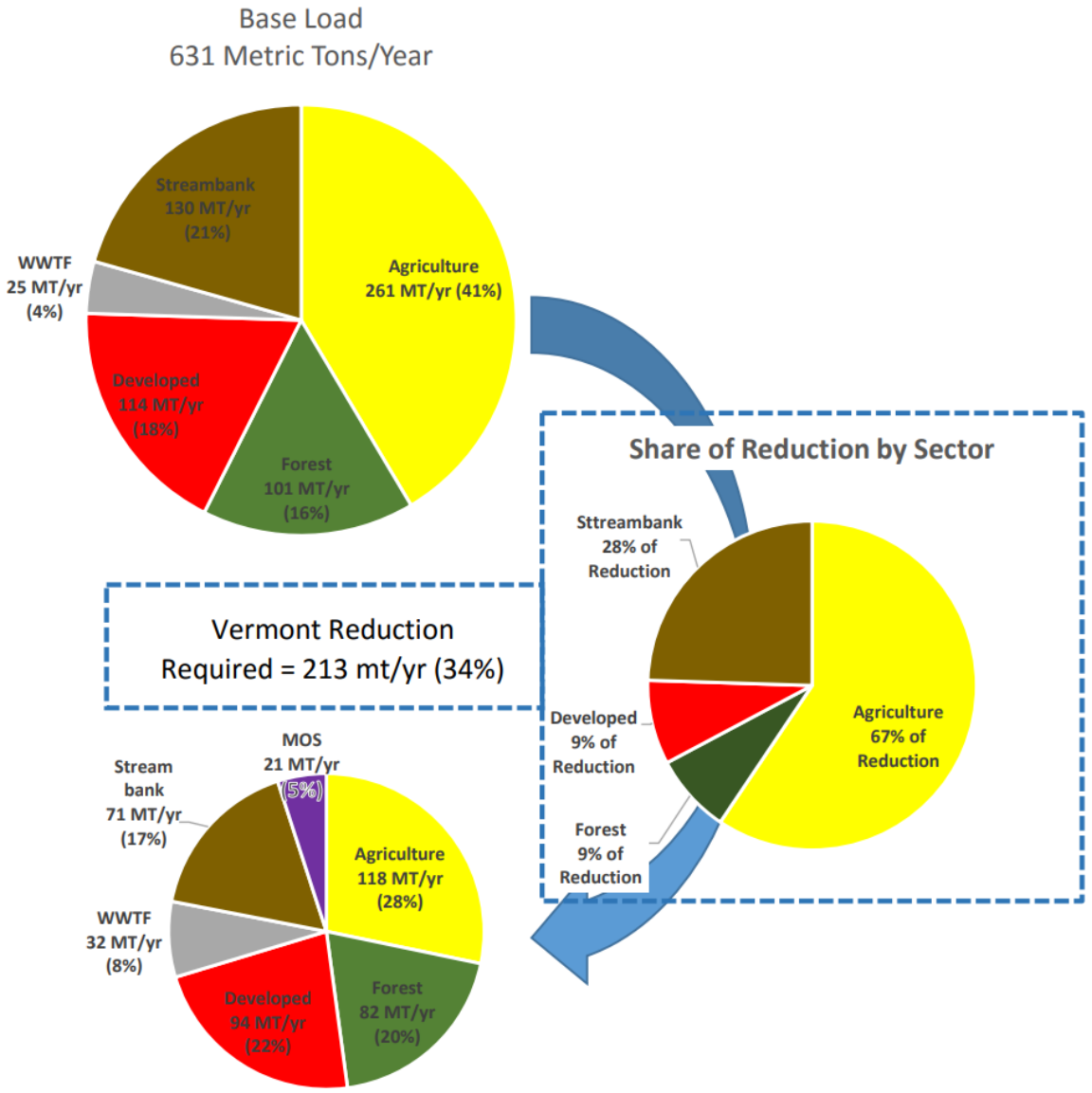

Table 8. Percent reductions needed to meet TMDL allocations.

Lake Segment	Total Overall	Wastewater[1]	CSO	Developed Land[2]	Agricultural Production Areas	Forest	Streams	Agricultural Nonpoint
01. South Lake B	41.4%	0.0%		21.1%	80.0%	40.0%	46.7%	62.9%
02. South Lake A	55.5%	0.0%		18.1%	80.0%	5.0%		62.9%
03. Port Henry	55.4%			7.6%	80.0%	5.0%		62.9%
04. Otter Creek	23.6%	0.0%		15.0%	80.0%	5.0%	40.1%	46.9%
05. Main Lake	20.5%	61.1%		20.2%	80.0%	5.0%	28.9%	46.9%
06. Shelburne Bay	11.6%	64.1%		20.2%	80.0%	5.0%	55.0%	20.0%
07. Burlington Bay	31.2%	66.7%	11.8%	24.2%	0.0%	0.0%		0.0%
09. Malletts Bay	17.6%	0.2%		20.5%	80.0%	5.0%	44.9%	28.6%
10. Northeast Arm	12.5%			7.2%	80.0%	5.0%		20.0%
11. St. Albans Bay	24.5%	59.4%		21.7%	80.0%	5.0%	55.0%	34.5%
12. Missisquoi Bay	64.3%	51.9%		34.2%	80.0%	50.0%	68.5%	82.8%
13. Isle La Motte	11.7%	0.0%		8.9%	80.0%	5.0%		20.0%
TOTAL	33.7%	42.1%	11.8%	20.9%	80.0%	18.7%	45.4%	53.6%

[1]Percent change from current permitted loads

[2] Includes reductions needed to offset future growth

Source: Phosphorus TMDLs for Vermont Segments of Lake Champlain; https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=79000

Cost Effectiveness of State Clean Water Investments

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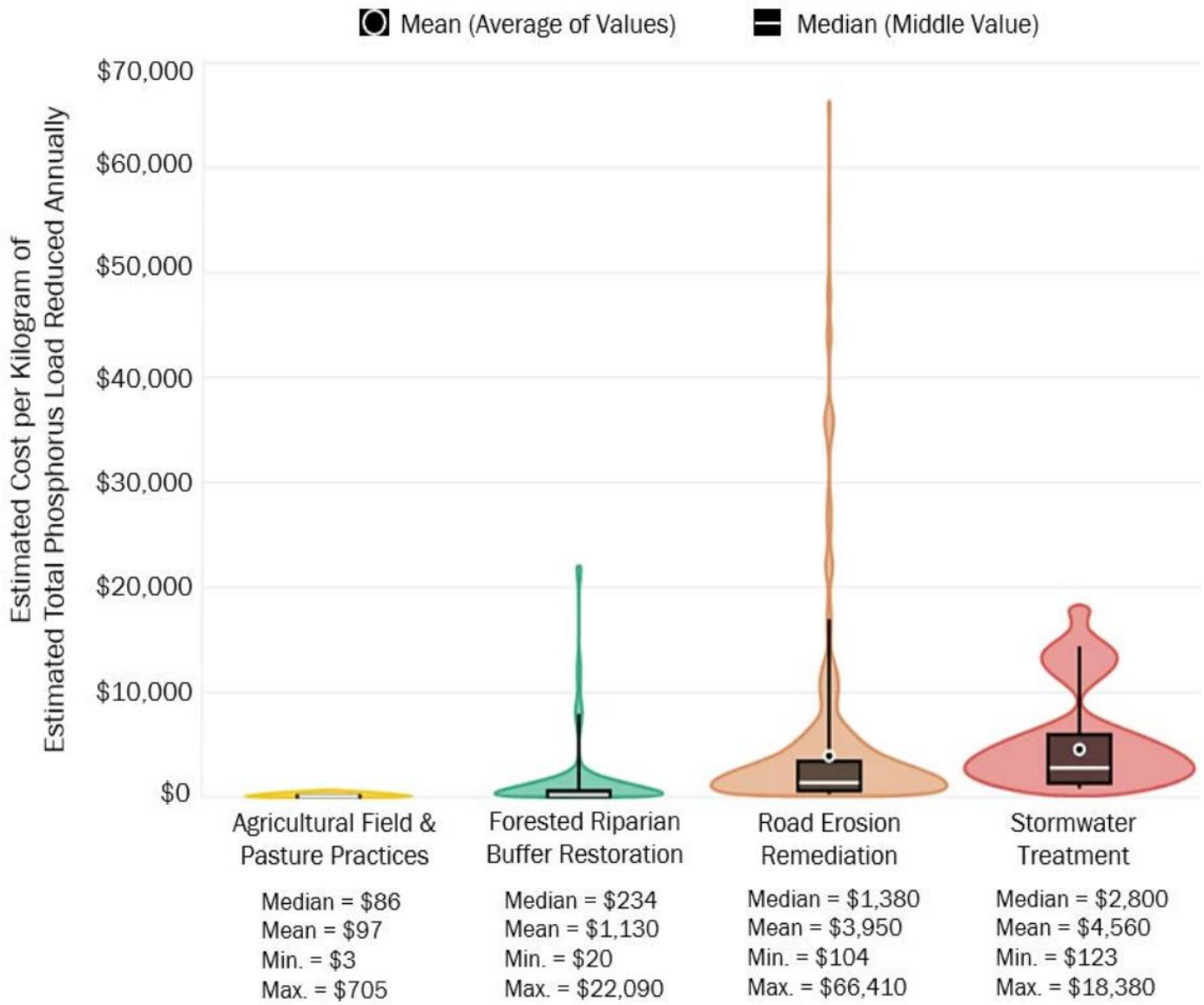

Vermont Clean Water Initiative 2020 Performance Report, Page 53: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2021-01-15_CleanWaterPerformanceReport_SFY2020-FINA-PDF-A.pdf

Results of Lake Champlain Basin Cleanup to Date

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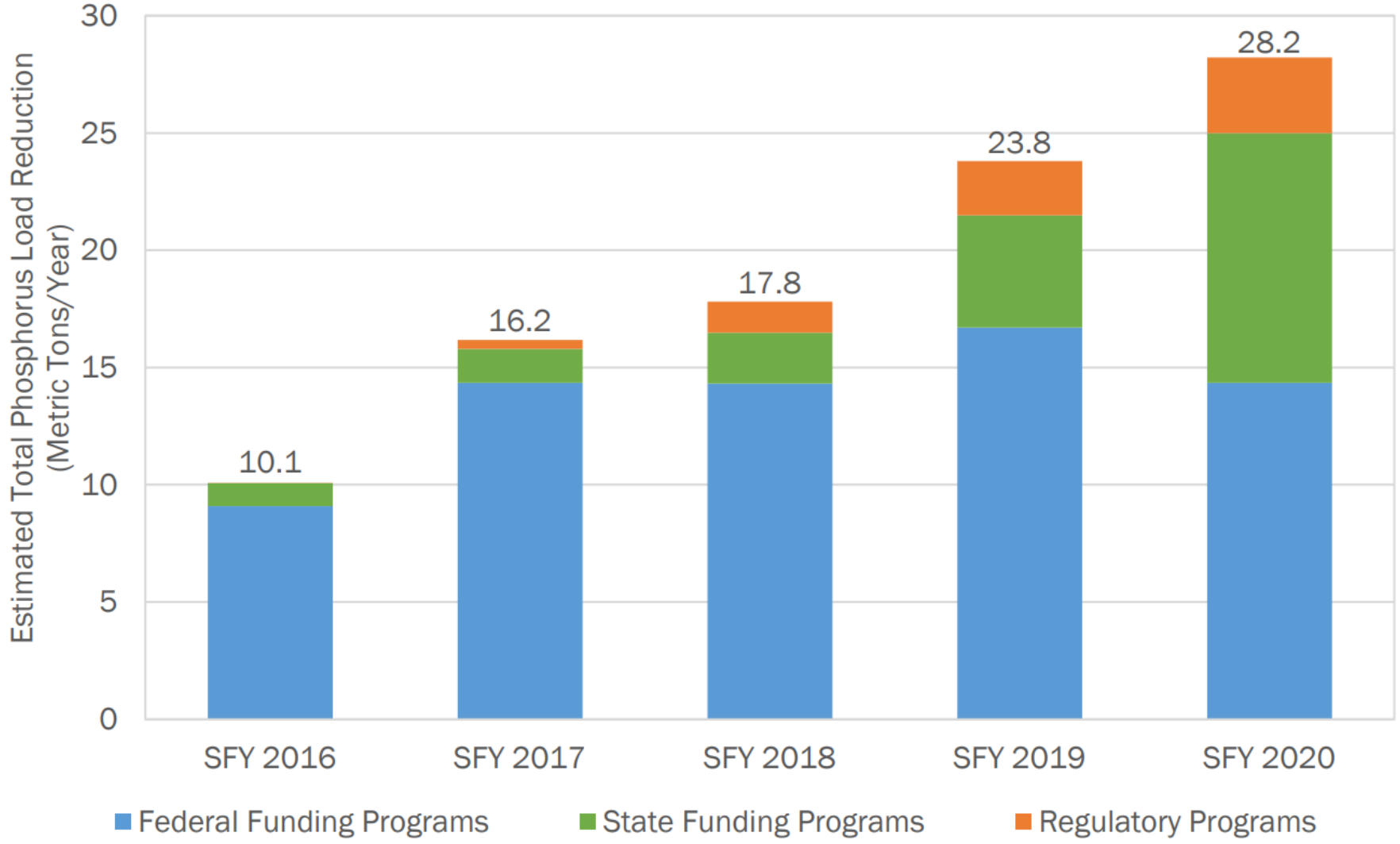
Estimated Total Phosphorus Load Reductions by Program Category



Vermont Clean Water Initiative 2020 Performance Report, Page 58: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2021-01-15_CleanWaterPerformanceReport_SFY2020-FINA-PDF-A.pdf

Results of Lake Champlain Basin Cleanup to Date

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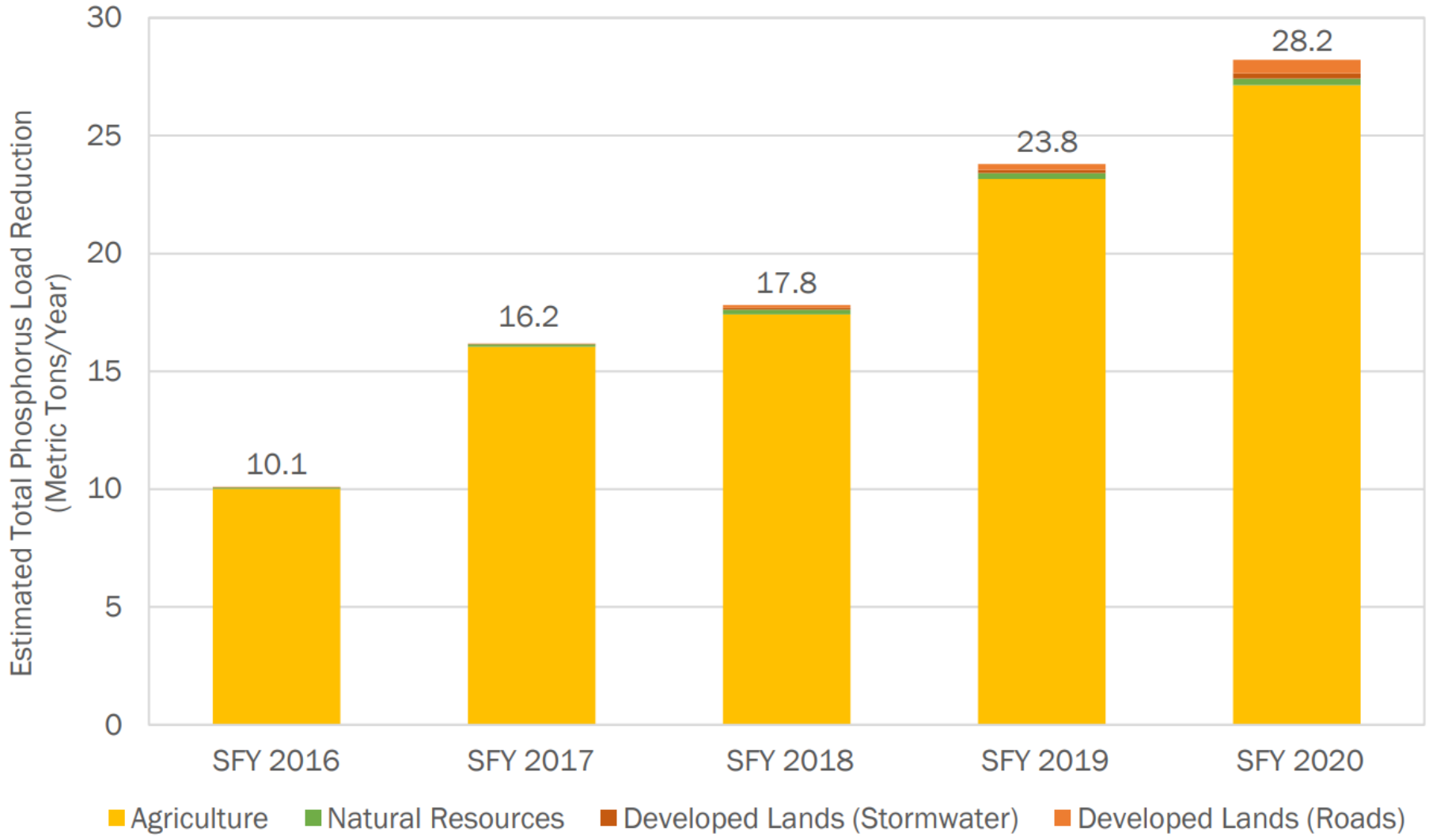
Estimated Total Phosphorus Load Reductions by Land Use Sector



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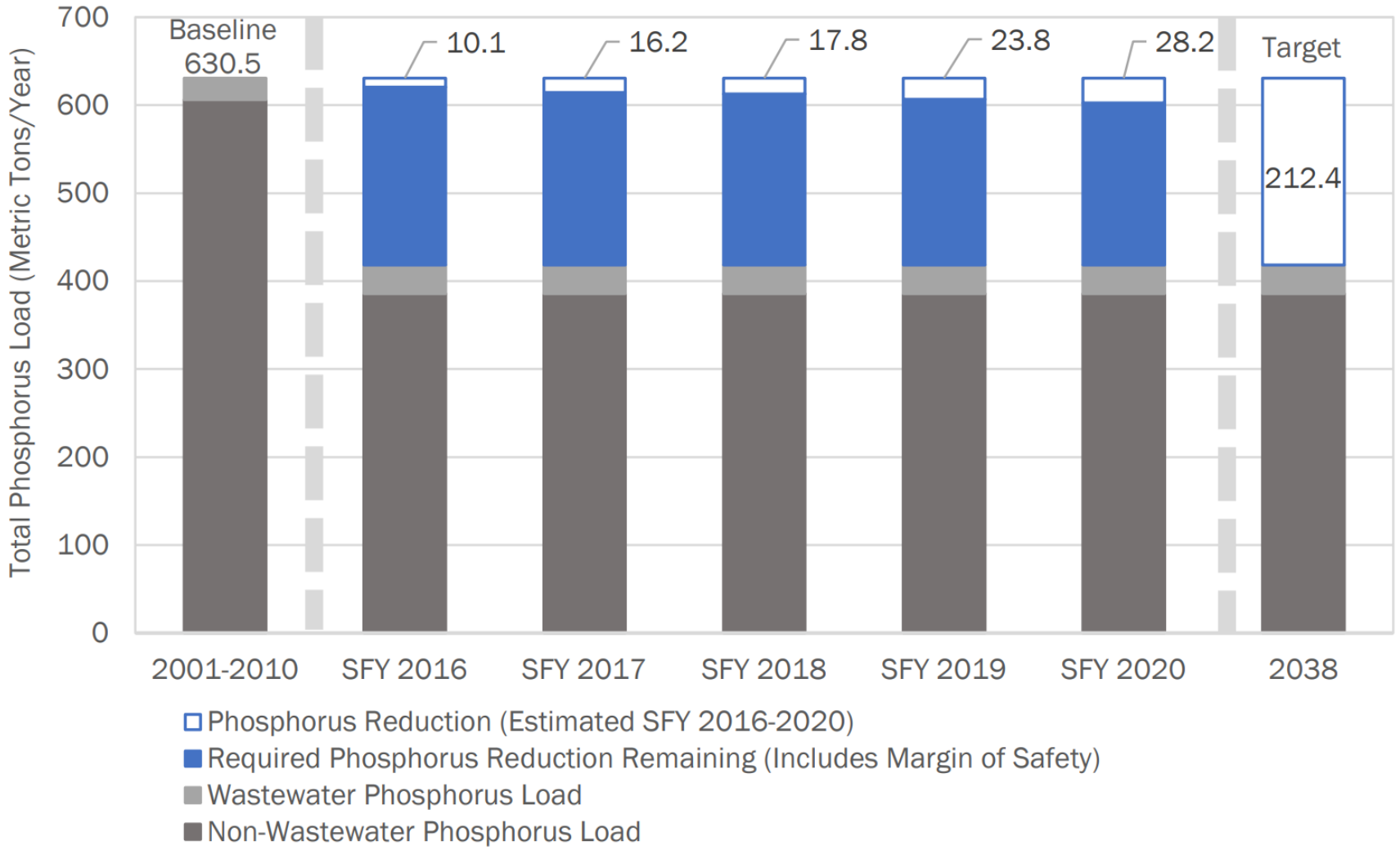
Estimated Total Phosphorus Load Reductions Relative to TMDL Baseline and Target



Vermont Clean Water Initiative 2020 Performance Report, Page 60: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2021-01-15_CleanWaterPerformanceReport_SFY2020-FINA-PDF-A.pdf

Payment for Ecosystem Services (PES)

"Created by the interactions of living organisms with their environment, ecosystem services provide the conditions and processes that sustain human life…

In its simplest form, PES is a transaction between landholders and the beneficiaries of the services their land provides."

James Salzman, Genevieve Bennett, Nathaniel Carroll, Allie Goldstein & Michael Jenkins, *Payments for Ecosystem Services: Past, Present and Future*, 6 TEX. A&M L. REV. 199 (2018).

Ecosystem Services

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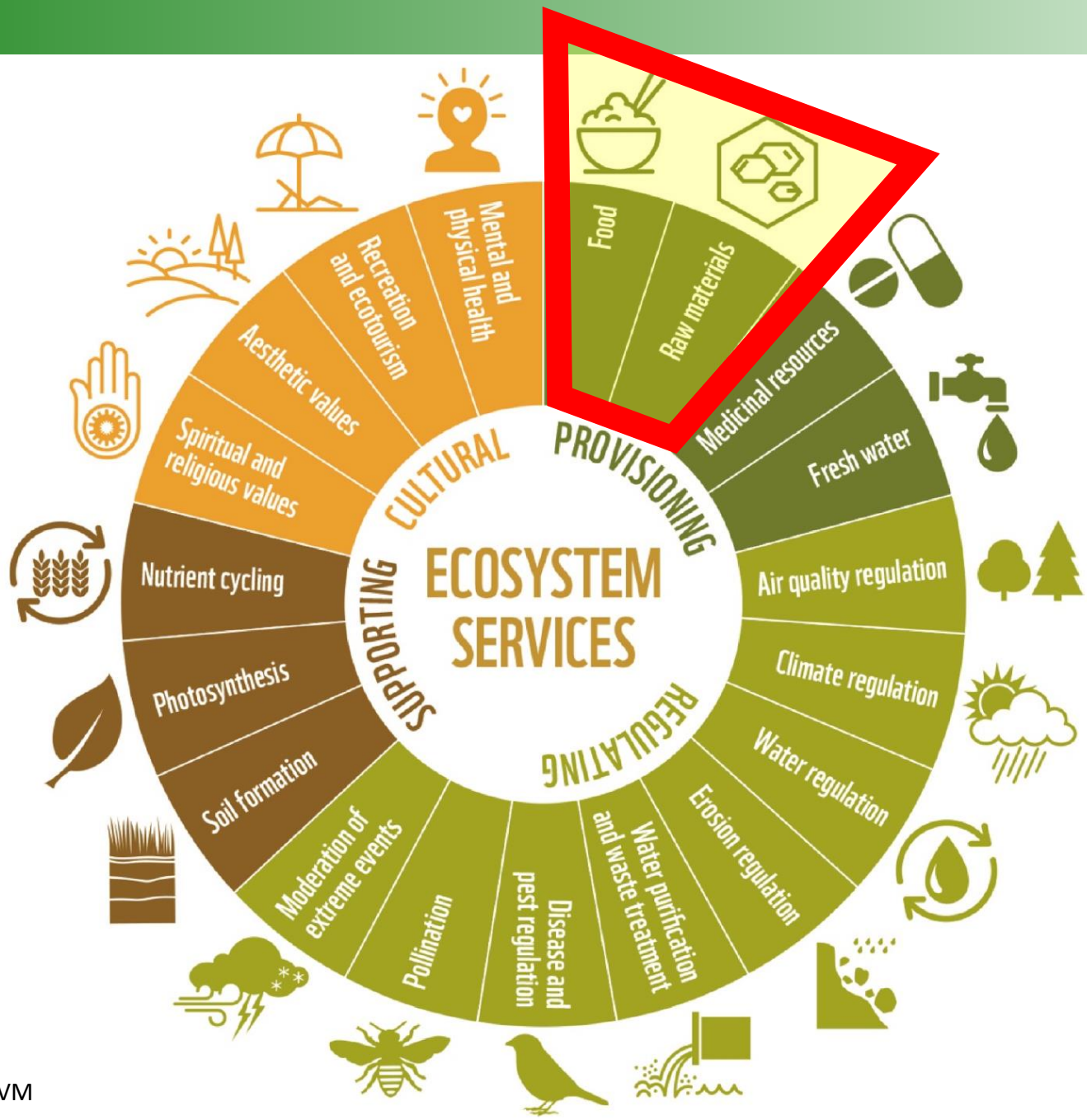
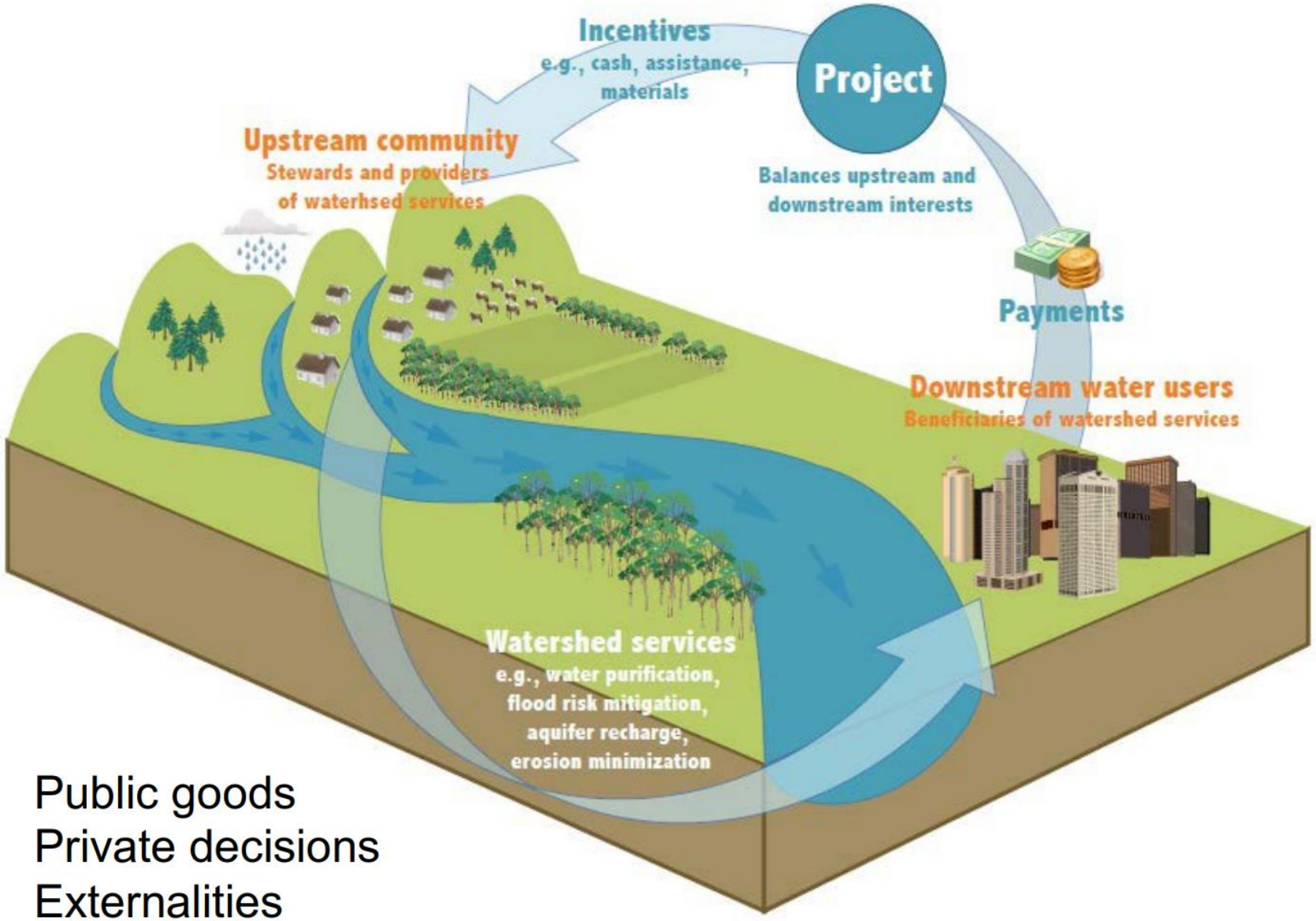


Source: Taylor Ricketts, Gund Institute, UVM

- Farmer Watershed Groups:
  - Champlain Valley Farmer Coalition (CVFC)
  - Connecticut River Watershed Farmers Alliance (CRWFA)
  - Franklin Grand Isle Farmer's Watershed Alliance (FWA)
- PES Working Group: agriculture.vermont.gov/pes
- Vermont Land Trust Soil Health CIG initiative
- Jon Winsten Pay-for-Performance CIG initiative

Market vs. Program



Public goods
Private decisions
Externalities

Mongabay.com

Targeted Approach:

Focus on just one aspect of Ecosystem Services (e.g. P reductions)

- More narrow
- Simpler
- Easier to calculate

Broad Approach:

Capture many aspects of Ecosystem Services (e.g. Soil Health)

- More holistic
- More complex
- Hard to calculate

Pay-for-Practice:

Based on implementation

- Simpler
- Easy to project payments
- Risk held by the program manager
- Payment assumed to result in benefit

Pay-for-Performance:

Based on outcomes

- More complex
- Hard to project payments
- Risk held by the farmer/land manager
- Payment tied to actual benefit

Vermont Pay-for-Phosphorus (VPFP) Program

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Pay-for-Practice:

- Farm Agronomic Practices Program (AAFM)
- Best Management Practices Program (AAFM)
- Pasture and Surface Water Fencing Program (AAFM)
- Environmental Quality Incentives Program (NRCS)
- Conservation Reserve Enhancement Program (FSA)
- Conservation Stewardship Program (NRCS)

Pay-for-Performance:

A new and exciting space!

Pay For Practice

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Project Output Measures[11]	2016	2017	2018	2019	2020	Total
Acres of agricultural conservation practices implemented (excluding other practices listed below)	5,466	3,261	7,908	14,566	19,619	50,820
Acres of agricultural land treated through innovative equipment	–	2,043	5,415	14,022	14,521	36,001
Acres of agricultural land treated by forest and grass buffers adjacent to surface waters (i.e., riparian areas)	258	200	228	0	0	686
Acres of pasture with livestock excluded from surface waters	258	117	97	47	15	534
Acres of water quality protections within newly conserved agricultural lands	–	116	200	513	250	1,079
Acres of agricultural conservation practices reported through technical assistance[12]	–	–	17	1,556	1,689	3,262
Number of barnyard and production area practices installed	59	86	96	77	119	437

Vermont Clean Water Initiative 2020 Performance Report, Page 32, : https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2021-01-15_CleanWaterPerformanceReport_SFY2020-FINA-PDF-A.pdf

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Based on implementation

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Based on outcomes

- More complex
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- Risk held by the farmer/land manager
- Payment tied to actual environmental benefit

Targeted Approach:

Focus on just one Ecosystem Service (e.g P reductions)

- More narrow
- Simpler
- Easier to calculate
- Can be easier to value

Broad Approach:

Capture many Ecosystem Services (e.g. Soil Health)

- More holistic
- More complex
- Hard to calculate
- Generally harder to value

Cost Effectiveness of State Clean Water Investments

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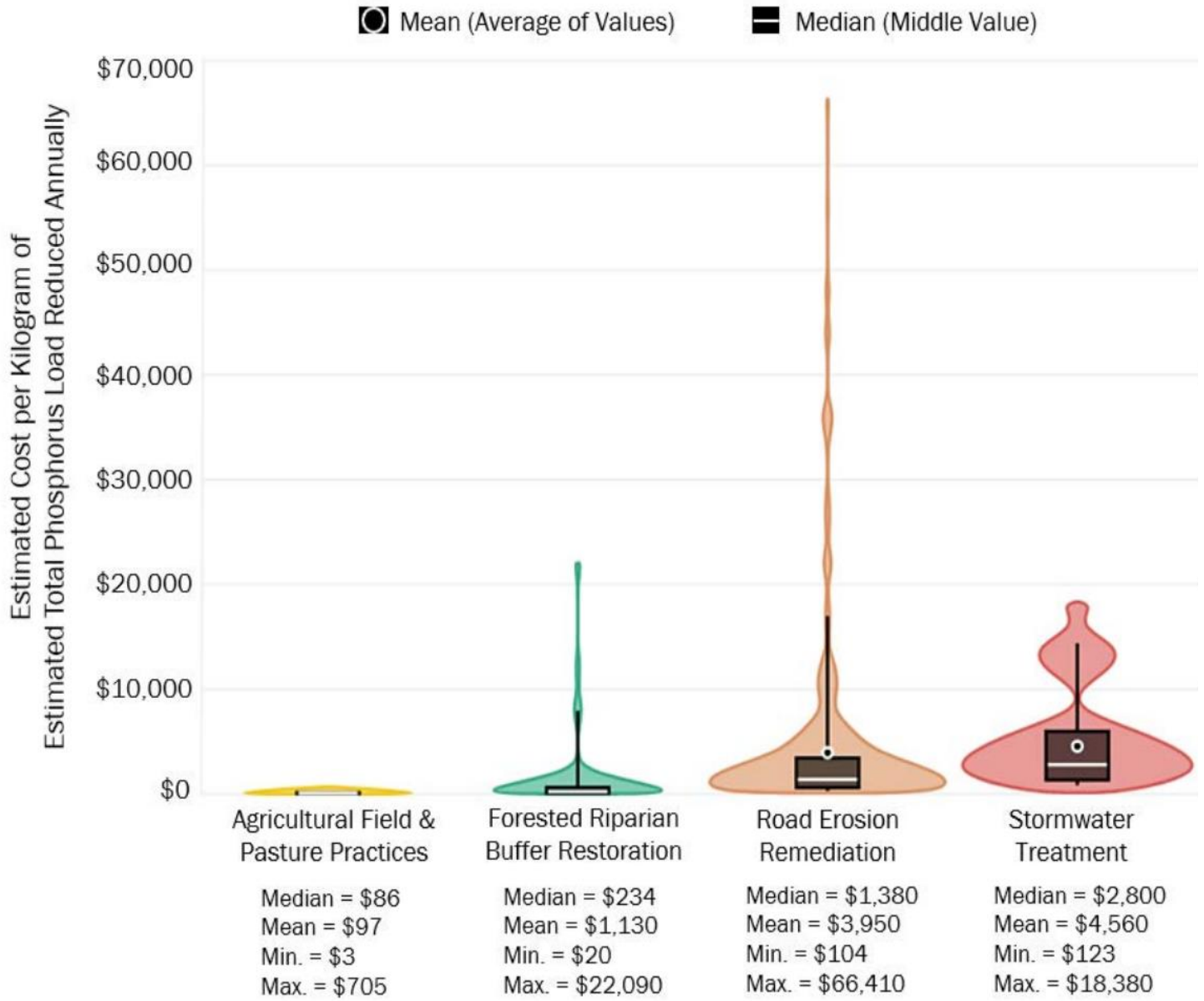

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Pay-For-Phosphorus is an innovative pay-for-performance approach that pays farmers for the pounds of phosphorus reduced by implementing conservation practices, as opposed to paying farmers a portion of the cost to install a practice.

- **Pays on results** improving cost-effectiveness and accelerating implementation
- **Flexibility for farms** to manage fields how they choose
- **Complements** existing State and Federal assistance programs (e.g. EQIP, FAP)
- **Statewide** voluntary program available to eligible farms
- **Incentive payments** for program enrollment regardless of farm performance

Goals:

Goals:

- Farmer buy-in

Goals:

- Farmer buy-in
- Verifiable, calculable, location-specific outcomes

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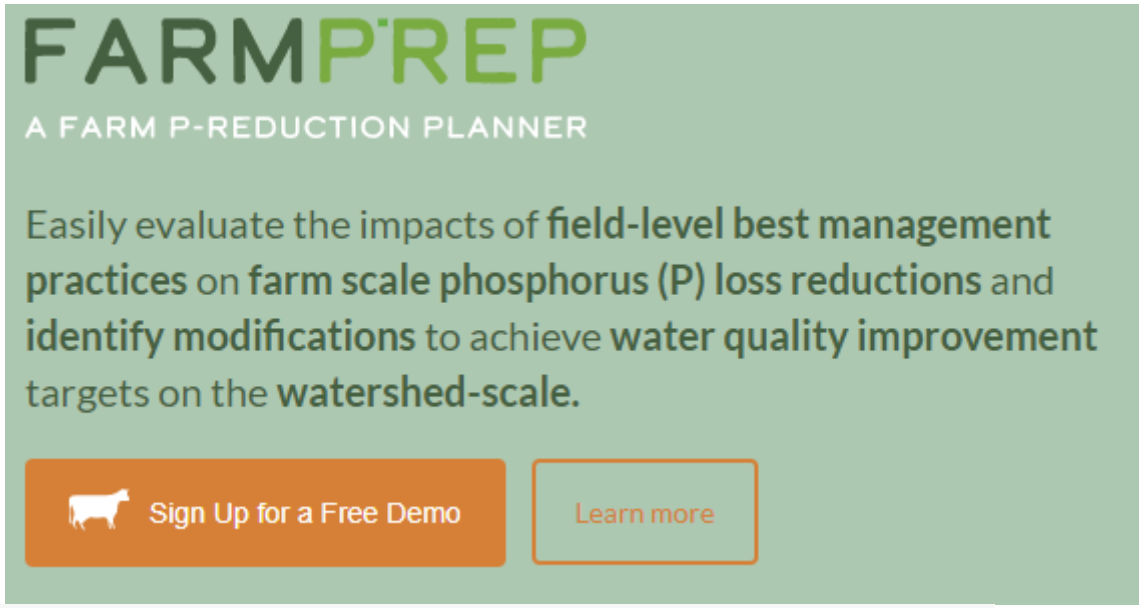
Lake Champlain Basin Program

TECHNICAL REPORT NO. 97

Implementation of a Farm Phosphorus ManagementOptimization Web-based Tool inthe Vermont Portion of the Lake Champlain Basin



Farm Practices Scenario	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)	Compare
Baseline:			2.67	1.92	0.75	0	0	
Current:	7.24		2.48	1.76	0.72	0	0	

	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)
F1_Corn	13.76		4.01	2.52	1.49	0	0
F2_Corn	0		3.55	2.71	0.85	0	0
F3_Hay	0		0.49	0.36	0.13	0	0
F4_CornHay	0		1.62	1.39	0.22	0	0
F5_CornHay	0		1.62	1.3	0.32	0	0

Goals:

- Farmer buy-in
- Verifiable, calculable, location-specific outcomes
- **TMDL reductions and stewardship**

Goals:

- Farmer buy-in
- Verifiable, measurable, location-specific outcomes
- TMDL reductions and stewardship
- **Additionality of stewardship**

Threshold

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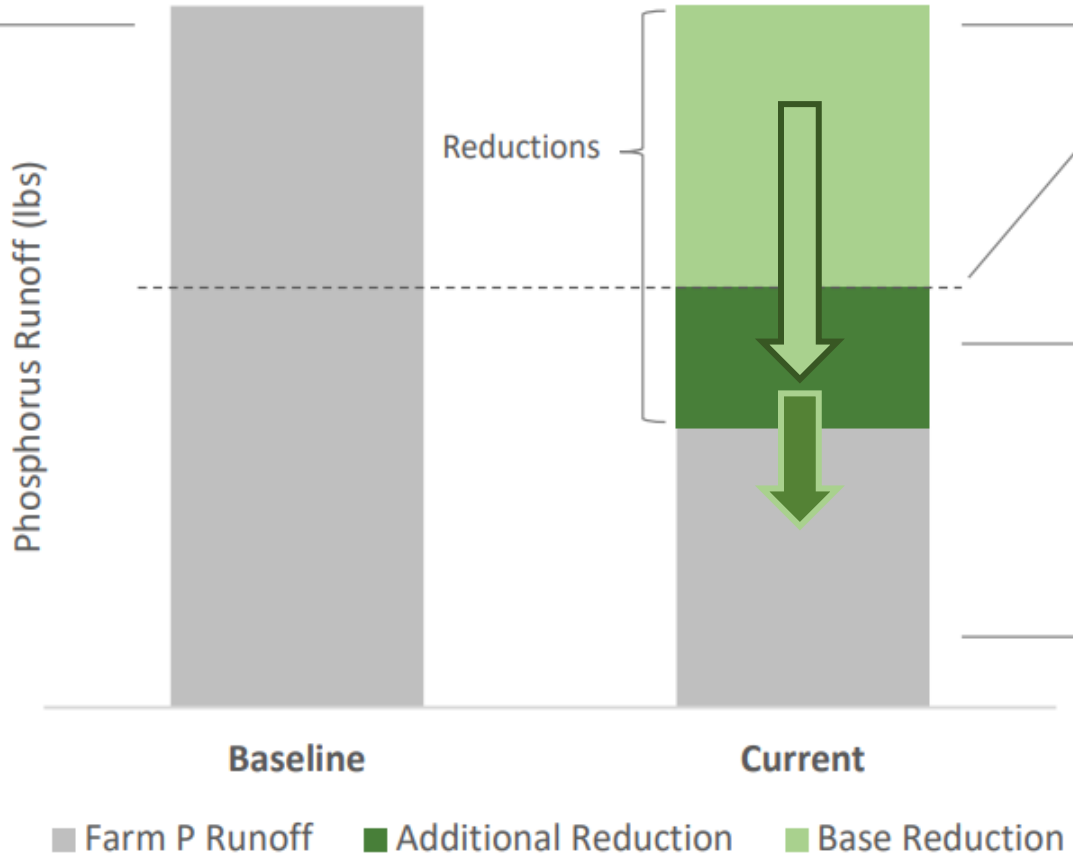
Base Farm P Runoff will be modeled based on historic TMDL management scenarios and will act as the baseline from which P runoff reductions are calculated.

Reductions can be achieved via improved nutrient management or conservation practices.



Base Reductions/Threshold corresponds to the P reductions that are estimated to be met through existing programs.

Additional Reductions beyond the threshold will be paid through the VPFP program based on a set price per pound of P.

Current Farm P Runoff based on a farm's current management.

Goals:

- Farmer buy-in
- Verifiable, calculable, location-specific outcomes
- TMDL reductions
- Additionality of stewardship
- **Sufficiency of payment**

Goals:

- Farmer buy-in
- Verifiable, calculable, location-specific outcomes
- TMDL reductions
- Additionality of stewardship
- Sufficiency of payment
- **Equity and Efficiency of program funding**

(1) **Data Entry Payment:** for data entry into the FarmPREP software.

- $15/acre, max $4000, one-time only

(2) **Payment for Phosphorus:** for phosphorus reductions resulting from the year's management.

- Paid per pound of phosphorus. Price will consider existing cost to the state of P-reductions.
- Verification: field implementation matches FarmPREP data, meets program standards

Annual Timeline

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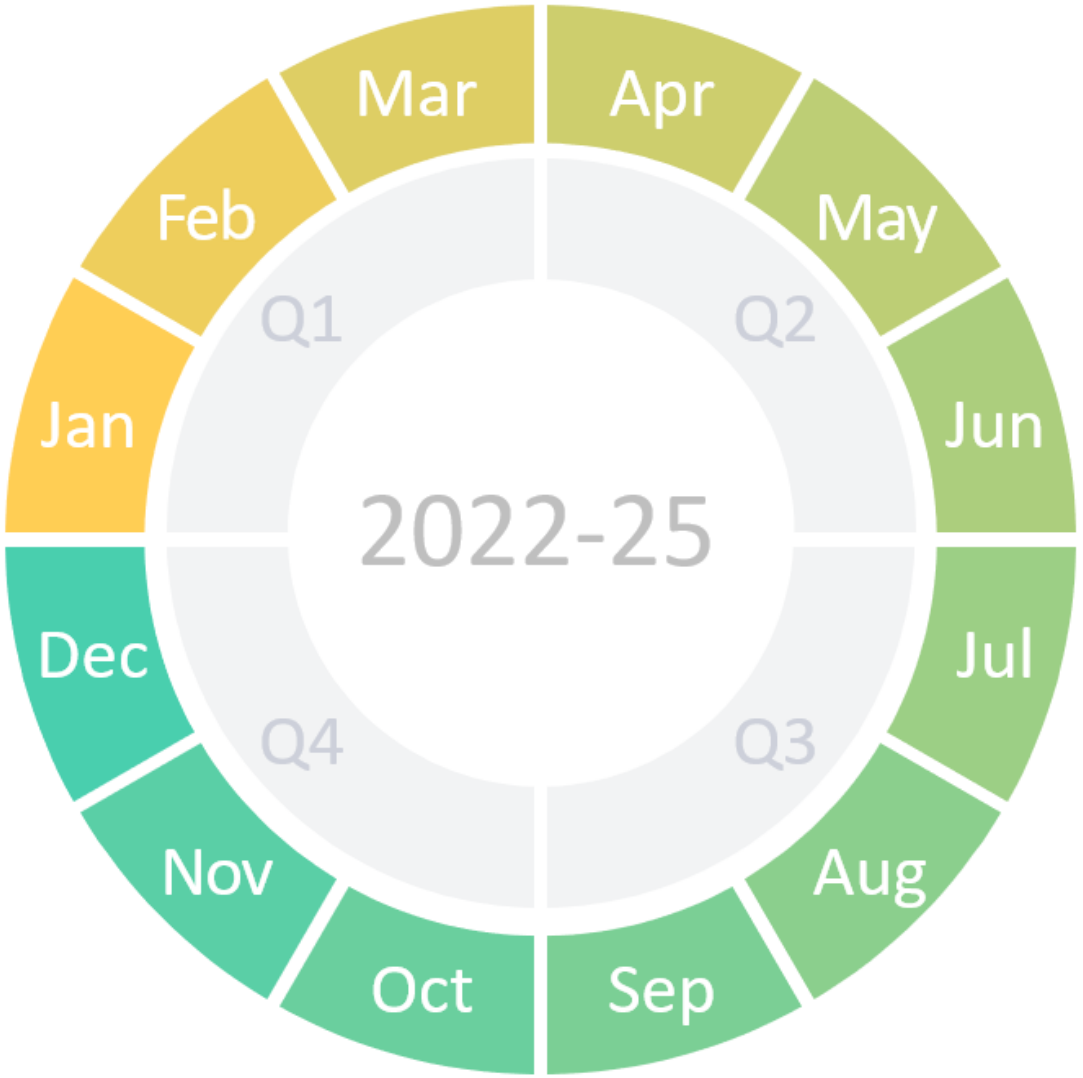
Farms:
- VPFP paperwork for upcoming year
- FarmPREP data entry
- (Payment received for past year)

Partners:
- Assist with FarmPREP data entry



Farms:
- FarmPREP data entry
- Spring practice implementation

Partners:
- Assist with FarmPREP Data entry
- Spring field verification

Farms:
- Fall practice implementation
- (Apply for following year VPFP)

Partners:
- Fall field verification cont.
- Data “clean-up” with farms
- End-of-season reporting to AAFM

Farms:
- Summer/Fall implementation

Partners:
- Spring field verification cont.
- Data “clean-up” with farms
- Fall field verification

AAFM Conservation Innovation Grant (CIG) Research Initiative

12-14 farms will work with AAFM staff to enter their data in FarmPREP.

These farms will offer feedback on important questions relating to setting up the VPFP program

Key CIG Questions:

- What is a reasonable price for a pound of phosphorus?
- How do loading, potential reductions, and potential payments in FarmPREP differ by:
  - land use (e.g. corn, hay, other crops)?
  - field characteristics (e.g. soil type, slope)?
- What decisions do we need to make to ensure that the VPFP program meets our program goals?

Year-by-Year Timeline

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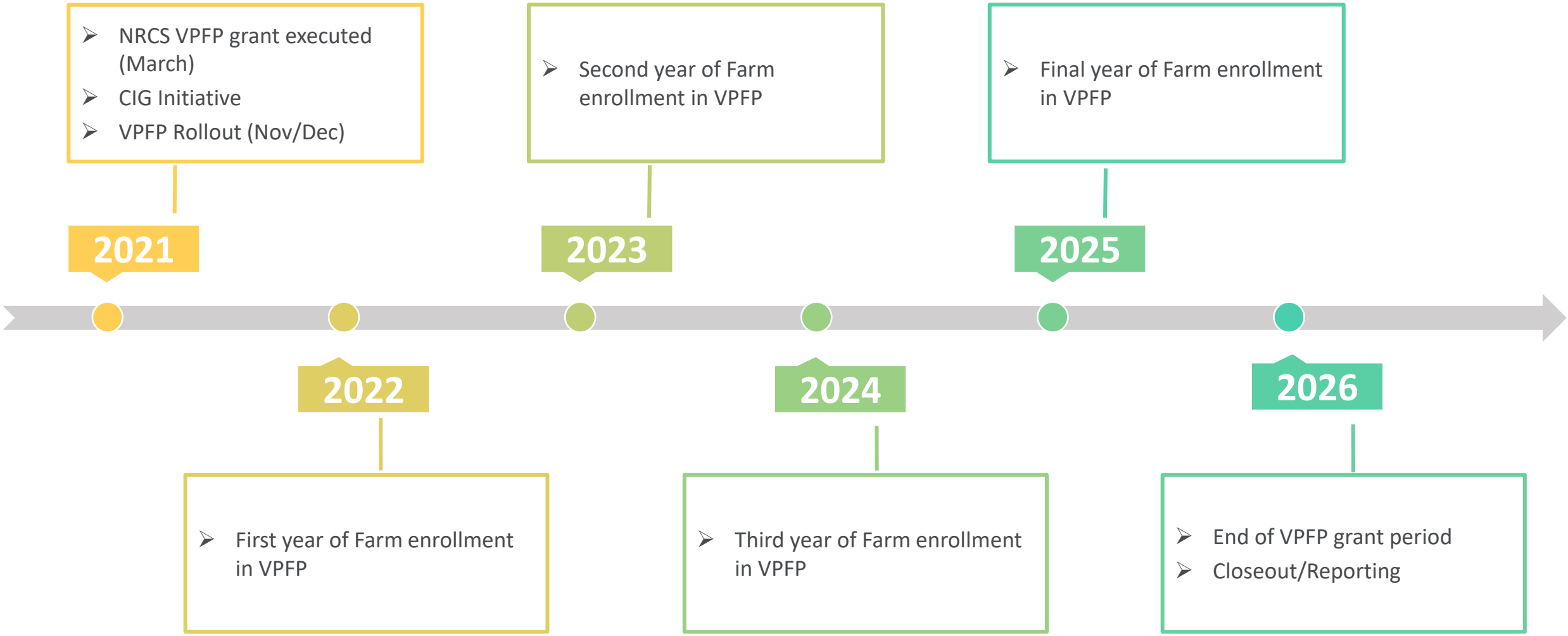

Visit the webpage:

https://agriculture.vermont.gov/vpfp

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